MODELS WW1071/2

100MS/s Single/Dual Channel Arbitrary Waveform Generators

Specification

CHANNELS

No. of Channels:	1/2, semi-independent

STANDARD WAVEFORMS

Waveforms:	Sine, Triangle, Square, Pulse, Ramp, Sine(x)/x, Gaussian, Exponential, Repetitive Noise, DC.
Frequency Range:	
Sine	100µHz to 50MHz
Square, Pulse	100µHz to 30MHz
All others	100µHz to 15MHz

SINE

Start Phase:	0 to 360°
Phase Resolution:	0.1°
Harmonics Distortion, 3Vp-p (typ.):	
DC to 2.5MHz	<-55dBc
2.5MHz to 25MHz	<-40dBc
25MHz to 40MHz	<-35dBc
40MHz to 50MHz	<-22dBc
Non-Harmonic Distortion (typ.):	
DC to 15MHz	<-70dBc
15MHz to 50MHz	<-60dBc
Total Harmonic Distortion:	
DC to 100kHz	0.1%
Flatness (1kHz)(typical):	
DC to 1MHz	1%
1MHz to 25MHz	5%
25MHz to 50MHz	20%
Phase Noise (8 points Sine, Max. SCLK)	
100Hz Offset	<-103dBc/Hz
1kHz Offset	<-110dBc/Hz
10kHz Offset	<-118dBc/Hz
100kHz Offset	<-124dBc/Hz
1MHz Offset	<-135dBc/Hz

TRIANGLE, RAMP

Start Phase:	0 to 360°
Phase Resolution:	0.1°
Timing Ranges:	0%-99.9% of period

SQUARE, PULSE

Duty cycle:	1% to 99%
Timing Ranges:	0%-99.9% of period
Rise/Fall time:	<8ns
Aberration:	<5%

SINC (SINE(x)/x)

"0" Crossing:	4 to 100 cycles

GAUSSIAN PULSE

Time Constant:	1 to 200

EXPONENTIAL FALL/RISING PULSE

Time Constant:	-100 to 100

DC

Range:	-5V to 5V

DIGITAL PULSE GENERATOR OPTION

Pulse Mode:	Single or double, programmable
Polarity:	Normal, inverted, complement
Period:	40ns to 1000s
Resolution:	10ns
Pulse Width:	20ns to 1000s
Rise/Fall Time:	
Fast	<6ns (typ.)
Linear	10ns to 1000s
High Time, Delay & Double Pulse Delay:	10ns to 1000s
Amplitude Window:	10mVp-p to 10Vp-p(1)
Low Level	-5V to +4.995V(1)
High Level	-4.995V to +5V(1)
(1)	Double into high impedance

NOTES:

1. All pulse parameters, except rise and fall times, may be freely programmed within the selected pulse period provided that the ratio between the period and the smallest incremental unit does not exceed the ratio of 1,000,000 to 1. With the 2M option, the ratio is extended to 2,000,000 to 1, hence the specifications below do not show maximum limit as each must be computed from the above relationship.

2. Rise and fall times, may be freely programmed provided that the ratio between the rise/fall time and the smallest incremental unit does not exceed the ratio of 100,000 to 1.

3. The sum of all pulse parameters must not exceed the pulse period setting

ARBITRARY WAVEFORMS

Sample Rate:	100mS/s to 100MS/s
Vertical Resolution:	14 Bits
Waveform Memory:	1M points standard, 2M/4M option (per channel)
Min. Segment Size:	16 points
Resolution:	4 points
No. of Segments:	1 to 2k

SEQUENCED ARBITRARY WAVEFORMS

Operation:	Permits division of the memory bank into smaller segments. Segments may be linked, and repeated in user-selectable fashion to generate extremely long waveforms.
Sequencer steps:	1 to 2k
Min. Seg. Duration:	1µs
Segment loops:	1 to 1M

ADVANCE MODES

Automatic:	No triggers required to step from one segment to the next. Sequence is repeated continuously through a pre-programmed sequence table.
Stepped:	Current segment is sampled continuously, external trigger advances to next programmed segment.
Single:	Current segment is sampled to the end of the segment including repeats and idles there. Next trigger advances to next segment.
Mixed:	Each step of a sequence can be programmed to advance either: a) automatic (Automatic mode), or b) with a trigger (Stepped mode)
Advance Source:	External (TRIG IN), Internal or software

MODULATION

COMMON CHARACTERISTICS

Carrier Waveform:	Sine, Triangle, Square, Pulse, Ramp, Sine(x)/x, Gaussian, Exponential, Repetitive Noise, DC and Arb
Carrier SCLK:	100mS/s to 100MS/s
Carrier Frequency:	Waveform dependent
Resolution:	12 digits, limited by 1µHz
Accuracy:	0.1%
Freq. Distortion:	<0.1%
Modulation Source:	
Internal	FM, Arbitrary FM, Sweep
External	AM, FSK

FM

Modulating Shape:	Sine, Square, Triangle / Ramp
Modulation Freq.:	1mHz to 100kHz
Deviation Range:	100mS/s to 50MS/s

ARBITRARY FM

Modulating Shape:	Arbitrary waveform, 10 to 20000 waveform points
Modulating SCLK:	1mS/s to 2MS/s
Deviation Range:	100mS/s to 50MS/s

AM

Envelope Freq.:	1µHz to 500kHz
Sensitivity:	0V to +5V (5Vp-p)

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Specification

Modulation Depth: 0% to 100%

FSK

Type:	Hop or Ramp
Low level:	Carrier sample clock
High level:	Hop frequency
Baud Rate Range:	1bits/sec to 10Mbits/sec
Min. FSK Delay:	1 waveform cycle + 50ns
Ramp FSK:	
Time	10µs to 1s
Resolution	3 digits

SWEEP

Sweep Time:	1ms to 1000s
Sweep Step:	Linear, Logarithmic or Arb
Sweep Direction:	Up or down

COMMON CHARACTERISTICS

FREQUENCY

Resolution:	
Display	11 digits (limited by 1µHz)
Remote	14 digits (limited by 1µHz)
Accuracy/Stability:	Same as reference

ACCURACY REFERENCE CLOCK

Internal	0.0001% (1ppm TCXO) initial tolerance over a 19°C to 29°C temperature range; 1ppm/°C below 19°C and above 29°C; 1ppm/year aging rate
External	10MHz TTL, 50% duty cycle

AMPLITUDE

Range:	10mV to 10Vp-p, into 50Ω; Double into open circuit
Resolution:	4 digits
Accuracy (1kHz):	
100mV to 1Vp-p	±(1% + 5mV)
1Vp-p to 10Vp-p	±(1% + 25mV)

OFFSET

Range:	0 to ±4.5V
Resolution:	2.2 mV
Accuracy:	1%

FILTERS

Type:	25MHz / 50MHz Elliptic

OUTPUTS

MAIN OUTPUTS

Coupling:	DC coupled
Connector:	Front panel BNC
Impedance:	50Ω, ±1%
Protection:	Protected against temporary short to case ground

SYNC/MARKER OUTPUT

Connector:	Front panel BNC
Impedance:	50Ω, ±1%
Level:	>2V into 50Ω, 4V into 10kΩ
Validators:	BIT, LCOM
Protection:	Protected against temporary short to case ground
Position:	Point 0 to n
Width:	4 to 100000 points
Resolution:	4 points
Source:	Channel 1

SAMPLE CLOCK OUTPUT

Connector:	Rear panel SMB
Level:	ECL
Impedance:	50Ω, terminated to –2V

SINEWAVE OUTPUT

Connector:	Rear panel BNC
Impedance:	50Ω, ±1%
Level:	1V into 50Ω
Protection:	Protected against temporary short to case ground
Source:	Sample clock frequency
Frequency Range:	100mHz to 100MHz
Resolution:	Same as Sample clock
THD:	0.05% to 100kHz
SFDR:	<-30dBc to 100MHz

INPUTS

TRIGGER INPUT

Connector:	Rear panel BNC
Input Impedance:	10kΩ, ±5%
Polarity:	Positive or negative
Threshold Level:	TTL
Min. Pulse Width:	20ns

EXTERNAL REFERENCE INPUT

Connector:	Rear panel BNC
Frequency:	10MHz
Impedance & Level:	10kΩ ±5%, TTL, 50% ±5%

AM INPUT

Modulation Input:	Rear panel BNC
Impedance:	1MΩ, ±5%
Max. Input Voltage:	12V

SAMPLE CLOCK INPUT

Connector:	Rear panel SMB
Input Level:	ECL
Impedance:	50Ω, terminated to –2V
Range:	100mHz to 100MHz
Min. Pulse Width:	4 ns

SYNCHRONIZATION CONNECTOR

Connector:	Rear panel 9-pin D-SUB
SYNC Cable:	Optional, consult factory at the time of purchase

RUN MODES

Continuous:	Free-run output of a waveform
Triggered:	Upon trigger, outputs one waveform cycle. Last cycle always completed
Gated:	External signal enables generator. First output cycle synchronous with the active slope of the triggering signal. Last cycle of output waveform always completed
Burst:	Upon trigger, outputs a single or multiple pre-programmed number of waveform cycles from 1 through 1M

TRIGGER CHARACTERISTICS

System Delay:	1 Sample Clock + 150ns
Trigger Start, Stop & Phase Control:	0 to 1M (2M/4M optional)
Resolution:	4 points
Breakpoint Error:	±4 points
Breakpoint Source:	External, Manual, or command

EXTERNAL

Connector:	Rear panel BNC
Level:	TTL
Slope:	Positive or negative
Frequency:	DC to 2MHz
Impedance:	10kΩ, DC coupled

INTERNAL

Range:	100mHz to 2MHz
Resolution:	14 digits, limited by 1µHz
Accuracy:	0.1%

MANUAL

Source:	Soft trigger command from the front panel or remote

INTER-CHANNEL DEPENDENCY (WW1072)

Separate controls:	Output on/off, amplitude, AM, offset, standard waveforms, user waveforms, waveform size, sequence table, channel 2 clock divider, trigger start phase, breakpoints